

Contextual Learning by Using *Batik Semarang* for Improving Students' Learning Achievement

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Article Info

Article history:

Received 18 July 2020

Approved 28 August 2020

Published 31 August 2020

Keywords:

Contextual Learning, Local Potential, *Batik Semarang*, Learning Achievement

Abstract

This Research is aimed for knowing, (1) the implementation of contextual learning by using *Batik Semarang* for physics material especially temperature and heat, (2) the improvement of students' learning achievements after the application of contextual learning by using *Batik Semarang*, and (3) the students' responses after being given contextual learning by using *Batik Semarang*. This research mix methods, namely quantitative and qualitative. This research was conducted in two classes at SMK Walisongo Semarang for student class X TKJ Telkom 1 as experimental class and X TKJ Telkom 2 as control class. The identification of local potential of *Batik Semarang* was carried out by using interview and observation technique which were then analyzed qualitatively and the result was substituted to physics material, namely temperature and heat. Furthermore, learning achievements were assessed from sides of cognitive, affective and psychomotor. The result showed that contextual learning by using *Batik Semarang* was effective for improving cognitive learning achievements as proved by experimental class having value of 0.79 which was higher than the control class of 0.57. In addition, the result showed that contextual learning by using *Batik Semarang* was effective in improving effective learning achievements as proved by the experimental class average of 86.55 which was higher than the control class of 76.73. The result also showed that contextual learning by using *Batik Semarang* was effective in improving psychomotor learning achievements as proved by the experimental class average score 33.3 higher than control class 25.4. The implementation of contextual learning by using *Batik Semarang* got a positive responses by students because it made them easier to understand concepts, to be more skilled, and increased students' interest in the learning process. Based on the result, it can be concluded that contextual learning with the use of *Batik Semarang* can be applied to study temperature and heat material in classroom. Contextual learning with the use of *Batik Semarang* can improve students' learning achievement. Contextual learning with the use of *Batik Semarang* got a good response by students.

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INTRODUCTION

Standar Kompetensi (SK) of physics learning in Decree of The Minister of National Education Number 23 of 2006 stated as to build students' knowledge and technology critically, logically and innovatively and enable the students to analyze natural phenomena according to the characteristics of each region (Permendiknas, 2006). The Ministry of Education and Culture in 2016 stated that the objectives of learning physics in 2013 Curriculum are mastering concepts and principles, having the skills, developing knowledge and self-confidence as a provision to continue students' education at higher level as well as developing science and technology (Sekarpratiwi *et al.*, 2018).

A students' centered learning process connecting by experience can facilitate students to understanding the concepts and be more skilled. But in fact, the main problem faced by some schools nowadays is that they still put teachers as the center of learning in delivering material (Katimo *et al.*, 2016). The teacher does not give students the opportunity to express their opinion during the learning process. Students only receive the physics material and they are not involved in the learning activities which result in students' lack of interest in learning and it affects their low understanding of the concepts (Rahmatika, 2021).

TIMSS survey by the IEA said that Indonesia has lower learning achievement than the other countries. It was shown in 2011 and 2015. Indonesia acquired average score of 386 and 397. Indonesia acquired average score of 386 and 397. This score was lower than the international average of 500 (Nugraha *et al.*, 2017). TIMSS survey in aspect of knowing in 2011 and 2015, showed a percentage of 36 % and 32 %. Aspect of application showed percentage of 27% and 24 % (Lubis, 2021). From the survey result above, it can be concluded that both aspects decreased. These results indicate that the low understanding of the concept will also

have an impact on the low learning achievements (Murniawati *et al.*, 2015).

Contextual learning can build students' knowledge and improve their conceptual understanding (Fuadi *et al.*, 2015). It is a process that connects concepts with the examples in everyday life (Rusman, 2014). Wirdati and Sulaiman (2018) stated that Bern and Erickson proposed 5 contextual learning strategies, namely (1) Problem based learning, (2) Cooperative learning, (3) Project based learning, (4) Service learning, and (5) Work based learning.

The Problem-based learning strategies will involve student's participation in solving the problems by integrating a variety of concepts. Based on this strategy, the appropriate learning in this research is Problem Based Instruction (PBI). Abas (2006:3) in Asmaniar (2017) stated that this model connects material and experience so that students are able to construct their own knowledge, develop their skills, and make them independent and confident.

Referring to the Decree of The Minister of National Education Number 23 of 2006, the students are expected to be able to analyze natural phenomena according to their respective regions. Therefore, the local potential in an area needs to be included in learning process. The local potential is a resource that exists in an area such as natural, human, technological and cultural resources (Sarah & Maryono, 2014).

Batik Semarang is one of the local potentials in Semarang city. *Batik Semarang* has naturalistic and realistic patterns that describe flora, fauna and landmarks in Semarang city (Suliyati & Yuliati, 2019). The various patterns of *Batik Semarang* include the patterns of *Lawang Sewu*, *Asem Sedompol*, *Kembang Asem*, *Warak Ngendog*, *Kuntul Sronдол*, and *Tugu Muda* (Subekti *et al.*, 2019). One of *Batik Semarang* pattern is presented in Figure 1.



Figure 1. The pattern of *Jagad Semarang*

The *Jagad* Semarang pattern is a depiction of the landmarks in Semarang city that reflect the universe or the small world that exists in Semarang city (Na'am, 2018). *Batik Semarangan* extremely develops in Semarang city, therefore the students should be familiar with it.

The concepts of Physics can be implemented in everyday life (Harefa, 2019), as well as the existence of Batik Semarang as a use of physics in surroundings. The use of *Batik Semarangan* in learning can motivate students' for taking up and make it as meaningful learning.

Wagiran (2011) in Shufa (2018) stated that the reasons of the need for the local potential to be included in physics learning are forming the personality and exploring the potential of the region. The local potential that can be implemented in learning helps the local culture development. In addition, by implementing the local potential in learning, it will help students to gain knowledge, be more skilled and form their personality. Dazrulliza (2018) stated that the learning tools by utilizing the local potential make the learning process effective. The utilization of local potential as a source of learning physics is one of the characteristics in the curriculum that makes the learning itself meaningful (Sarah and Maryono, 2014). Therefore, it is necessary to have contextual learning by utilizing the local potential of *Batik Semarangan* to improve students' learning achievements from the cognitive, affective and psychomotor domains.

RESEARCH METHODS

This research was conducted in semester 2 of the 2020/2021 academic year. The research subjects in this study were students of class X SMK Walisongo Semarang. The sample of this study was selected using probability sampling which was conducted randomly. The population was considered homogeneous based on the same curriculum, learning methods and student conditions. Furthermore, the control classes was X TKJ-Telkom 2 and the experimental class was X TKJ-Telkom 1.

This research started by identifying *Batik Semarangan* into physics material. Researcher interviewed the natives of Semarang city and then did observation at the making site of *Batik Semarangan* at FIGA studio, Kampung Batik Semarang, Semarang City. The results of the interviews and observations were used to identify *Batik Semarangan* related to temperature and heat.

After *Batik Semarangan* was identified, then it was applied to the learning. In this study, the control class was given conventional learning treatment while the experimental class was given contextual learning treatment using *Batik Semarangan*.

In the experimental class, the researcher gave a pre-test to the students at the beginning of the lesson. Furthermore, the researchers applied contextual learning by utilizing *Batik Semarangan*. The students were divided into several groups. The students were asked to watch the video about making *Batik Semarangan*. Students make a hypothesis from the video. They looked for information from the teaching material associated with *Batik Semarangan*. Furthermore, they proved the information received by making *batik* directly. The students make *batik* according to the procedure. They relate the material to the making process of *batik*. Later, they drew conclusions and did the practice questions. At the end of the lesson, they did a posttest. This research was conducted during the COVID-19 pandemic which required the students to learn online, so the researchers could only involve in some students in the class. The research in the experimental class was carried out in stages because it could only involve 10 students per face-to-face/offline learning.

During the learning process, the researcher were taken the learning achievements. The cognitive learning achievement that were carried out from the pre-test and post-test. The affective one taken from the observation sheet for assessing student attitudes during the learning process, and the psychomotor domains was taken from an observation sheet taken during the process of making *Batik Semarangan*. The data obtained were analyzed using the Independent Sample t-test:

$$t = \frac{x_1 - x_2}{\sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2} \left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

x_1 = sample mean 1

x_2 = sample mean 2

n_1 = number of sample 1

n_2 = number of sample 2

s_1 = standard deviation of sample 1

s_2 = standard deviation of sample 2

With a significance value $\alpha = 0,05$ and reject H_0 if the sig. < 0.05.

RESULTS AND DISCUSSION

The interview was taken to 10 interviewees, all of whom were native in Semarang city. The results of the interviews show that *Batik Semarangan* is one of the local potentials in Semarang city. The interviewee suggested to include *Batik Semarangan* into the learning at school. This made the students as the young generation can preserve the local potential in their area. Based on the results of direct observations of *batik* making at FIGA *batik* studio, Kampung Batik Semarang, it showed that the process of making *Batik Semarangan* could be substituted to physics material, namely Temperature and Heat. The process of making *batik*

that can be identified in terms of temperature and heat is presented in Table 1.

Table 1. Identifying *Batik Semarang* into the Material of Temperature and Heat

No.	Making Process of <i>Batik Semarang</i>	Temperature and Heat Material
1.	<i>Canting</i> process	Temperature, Heat, Heat Transfer by Conduction, Heat-conducting materials, Heat-conducting insulators and Changes in the state of matter
2.	<i>Pelorodan</i> Process	Heat, Heat Transfer by Convection, and changes in state of matter
3.	Drying Process	Heat Transfer by Radiation

Wagiran's research (2011) in Shufa (2018) showed that most of teacher state that local potential education is important to be implemented in the learning process. Utaminingsih, Utomo and Zamroni (2017) mentioned that it is important to revive the Indonesian character so that the learning apart from mastering technology also leading to the development of Indonesia's local potential and character.

After *Batik Semarang* was identified in the physics material of Temperature and Heat, then it was applied to the learning. After being given treatment, the learning achievements in the cognitive, affective and psychomotor domains were obtained.

The assessment of cognitive domain learning achievements from both control class and

experimental class were done through pre-test and post-test. The data obtained were then tested for normality and homogeneity which were then tested for N-Gain and comparative tests. The results of the study on the cognitive domains showed that the average N-Gain of the control class was in the medium category and the experimental class in the high category. The average learning achievements in the post test of experimental class obtained 91.45 and the control class obtained 78.46. So, the cognitive domain learning achievements in the experimental class were better than the control class. The average cognitive domain learning achievements are presented in Figure 2.

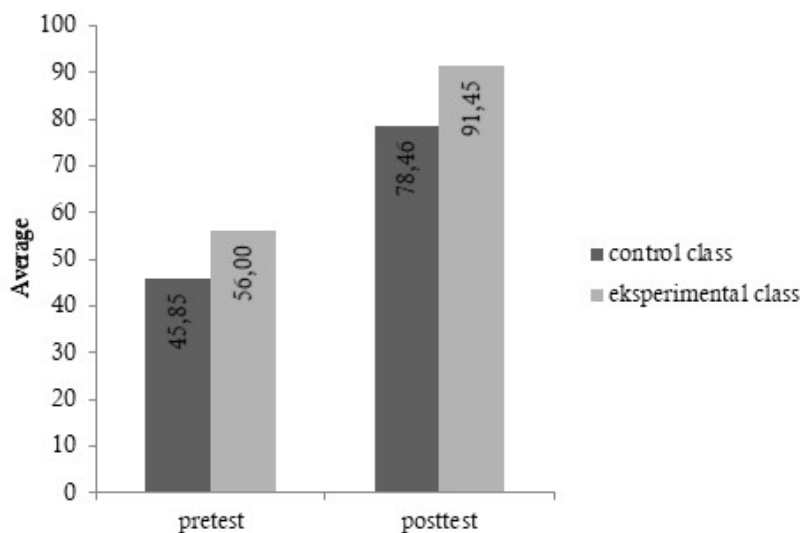


Figure 2. Average Student's Cognitive Learning Achievements

Based on the results above, it was shown that contextual learning with the use of *Batik Semarang* is effective in improving the learning achievements in the cognitive domain. The contextual learning by utilizing *Batik Semarang* is a learning that connects temperature and heat material with the experiences

possessed by the students. This allows the students to build their own knowledge. They can understand the concept of the learning material. After being given contextual learning by using *Batik Semarang*, they can give valid reasons and be confident in answering question. Before being given

a treatment, they have no given the valid reason, even some of them did not mention the reason in answering the question. According to research Fuadi, Adlim and Sabri (2015), applying the contextual learning can build students' knowledge and concepts understanding.

Based on the results of the study on the assessment of affective learning achievements, it was found that the control class got an average score of 76.73 and the experimental class got an average score of 86.55. The average score of the affective learning achievements assessment for each aspect is presented in Figure 3.

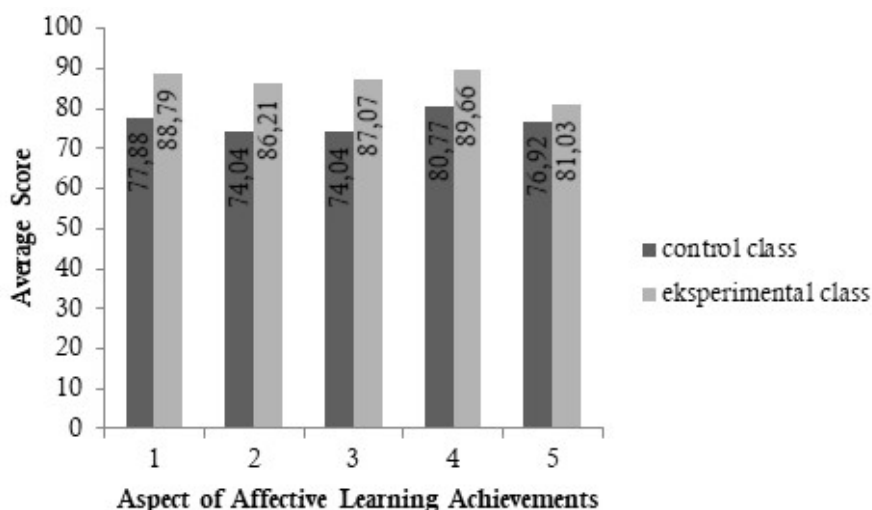


Figure 3. The Average Learning Achievements of Students' Affective Domain

Based on the comparison of the average score of affective learning achievements between the control and experimental classes in each aspect of the assessment, it can be seen that generally the average affective learning achievements of the experimental class are higher than the control class in every aspect. Based on the results of the research, it shows that the contextual learning with the use of *Batik Semarangan* is effective in improving the learning achievements in the affective domain. After being given treatment, students have a high sense of responsibility, confidence, serious in doing assessment and having an attitude of respecting the opinions of friends. They can show the expected behaviour or attitudes. The local potential-based learning can lead to an attitude of cooperation and responsibility (Sarah & Maryono,

2014). The contextual learning that connects with the real life can show the character or attitude of students (Ramdani, 2018). It can bring students directly into the real world as well as provide opportunities for students to socialize with the world around them and interact in the correct manner so that the good attitudes can be shown during the learning process (Andriansyah, 2020).

The results of the research on the assessment of psychomotor learning achievements using the average score comparison showed that the control class obtained an average score of 25.4 and the experimental class obtained an average score of 33.3. The average score of psychomotor learning achievements assessment is presented in table 2.

Table 2. Results of the Average Score of Psychomotor Ability

	Experimental Class	Control Class
Total Score	200	127
Average	33.33	25.4
Percentage	92.59	79.38

Based on the results of research above, it shows that contextual learning with the use of *Batik Semarangan* is effective in improving learning achievements in the psychomotor domain. Students were enthusiastic in observing

Batik Semarangan video. Students were not only more skilled in preparing tools and material, but also skilled in compiling procedures for making *Batik Semarangan*. The contextual learning that connects the material with the experiences

possessed by the students can train and improve their psychomotor abilities (Yulianti & Ramdhan, 2020).

The overall results of this research show that contextual learning with the use of *Batik Semarang* can improve students' learning achievements from the cognitive, affective and psychomotor domains. According to Ninawati's research (2020) integrating local cultural values into the learning can influence students, which in turn can mindsets and behavior strengthen the understanding, reasoning, creativity, critical thinking and communicative skills in solving problems at hand.

CONCLUSION

Contextual learning with the use of *Batik Semarang* can be applied to study temperature and heat material in classroom. Contextual learning with the use of *Batik Semarang* can improve students' learning achievement and get good responses from students.

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